

REMARKS

The outstanding Official Action and the art cited therein have carefully been considered and this application amended as believed appropriate.

The specification has been amended to include a "Cross Reference to Related Applications." Reference is made to applicants' prior international application from which this application claims priority. One further correction of a typographical error in the specification is made at page 7.

Claims 1 - 18 in this application were rejected as "incomplete," citing 35 U.S.C. § 112, second paragraph. Independent claim 1, to which the examiner's remarks on the § 112 rejection applied, has been cancelled in favor of new claim 19. The examiner's objection that claim 1 gave no relative position of the first insulation layer relative to the other components was noted and claim 19 sets forth that the "first insulating layer is provided on the first side of the semiconductor substrate." Further, the outstanding Official Action states that the relationship between the electrodes and the connecting conductor is unclear, the examiner questioning "does the connecting conductor connect to one or both of the electrodes, or is it connected to some other electrode or element?" New independent claim 19 sets forth that the "at least one connecting conductor" is "situated on and forming a part of the multilayer construction and electrically connected to an element of the multilayer semiconductor construction." Further, the examiner questions the use of the phrase "capable of being used with a drift detector." The questioned phrase is not present in new independent claim 19. With the foregoing changes, it is respectfully urged that claim 19 overcomes the prior rejection of claim 18 under 35 U.S.C. § 112, and that, thereby, all of the claims now present in the application meet the requirements of 35 U.S.C. § 112.

Claims 1 - 18 are further rejected in the outstanding Official Action under 35 U.S.C. § 103 as unpatentable over the published patent application of Iwanczyk et al. No. 2002/0139970 in view of the patent to Lingren No. 6,037,595. The published application of Iwanczyk et al., it should be noted, is virtually identical with the photodetector shown in the prior art references, the German published application No. DE 3427476 A1 and the publication of L. Struder in *Nuclear Instruments and Methods in Physics Research A* Vol. 454, pp. 73-113 (2000), both of which have been cited in the background of the invention in this application. It is also noteworthy that the German patent office has allowed the corresponding German patent

application which also cites the German published application and the Struder writing. Attached is a copy of the communication from the German patent office indicating the allowance of the corresponding German application. The claims of the allowed German application are of similar scope to those presented here.

Fig. 2 of the cited patent publication of Iwanczyk et al. illustrates a silicon drift photodetector, but without a "conductor crossover having at least one connecting conductor situated on and forming a part of the multilayer construction." Note that the connecting conductor M shown in Fig. 1 of the present application is deposited or formed directly on the insulating layer I. In other words, the multilayer semiconductor construction of claim 19 is an integrated construction in which the connecting conductor is a part of the integrated multilayer construction. In Iwanczyk et al. the connection to the anode 164 is shown not as a part of the multilayer conductor, but rather it appears to be of the nature of a short lead to a transistor (unnumbered) and a further conductor from that transistor to a charge amplifier. The connections to the electrodes in the Iwanczyk et al. published application are of the nature of what is called in the present application "freely guided contacting" of the anode or readout electrode. In other words, connections to leads brought off from the device in Iwanczyk et al. are not shown to be in a fixed position on nor are they shown to form a part of the integrated device.

Similarly, Lingren shows, in its radiation detector of Fig. 14B, connections to the anodes 1232 of leads that extend through openings 1422 in the electrode layer 1403 to the conductor 1242 that connects to the amplifier 1240. The conductors that connect to the anodes 1232 are not shown to be a part of the multilayer structure as is the connecting conductor in the present invention. And this is called for in claim 19. Combining the teachings of Iwanczyk et al. with those of Lingren, then, cannot result in the structure claimed in claim 19.

Referring to the "freely guided," i.e. unconstrained, conductors connecting to electrodes of a semiconductor detector of the kind to which this application relates, the "Background of the Invention" states:

The free guiding of connecting conductors has several disadvantages. The electrical contacting is difficult since the connecting conductors are typically attached by ultrasound bonding, whereby the semiconductor substrate tends to undergo undesired mechanical vibrations. As a result, faulty contacting may occur. Damage in the sensitive region of the semiconductor substrate upon bonding may cause the detector to fail. Furthermore, the free guiding of connecting conductors has disadvantages with regard to the stability of the

contacting and the combination of drift detectors in groups.

Concerning the "shielding electrodes" of the Lingren patent, these are said by Lingren to shield the anode from the effects of carriers in the adjoining semiconductor layer. These do not provide shielding between an integrated connecting conductor of a crossover and the semiconductor substrate as in the present invention.

As stated in the Summary of the Invention in this application, "The intermediate electrode is electrically insulated relative to the connecting conductor and the adjoining semiconductor substrate, and electrically shields at least one partial region of the semiconductor substrate between the semiconductor electrodes from the connecting conductor." Lingren, on the other hand, provides what the patent refers to as "control electrodes." Lingren explains "The area of the control electrode 508 should be substantially larger than the area of the anode 206 in order to "shield" the anode 506 from the hole-induced charge." This is the function of the Lingren control electrodes in each of the Lingren embodiments including that of Figs. 14A, B and C to which the examiner refers.

Dependent claims 2 - 18, and 20 - 24 incorporate by their dependency the provisions of parent claim 19 missing from both the Iwanczyk et al. publication and the Lingren patent and thus are patentable over that combination of references by their dependency.

The examiner's comments regarding the dependent claims 2 - 18 in the application have been reviewed. Applicants are not agreeing with these comments by not addressing them here. Rather, with the patentability of new independent claim 19, it is not necessary to address the examiner's comments on the dependent claims as these claims incorporate patentable subject matter by their dependency from claim 19.

New dependent claims 20 and 21 add that the "element of the multilayer semiconductor construction" to which is connected the connecting conductor is a readout electrode (in the case of claim 20) or a transistor (in the case of claim 21).

New dependent claim 22 spells out that the semiconductor substrate, the doped electrodes, the connecting conductor, the element to which the connecting conductor connects, the first insulating layer and the at least one intermediate electrode are all integrated features of an integrated multilayer semiconductor structure

New dependent claim 23 spells out that the "intermediate electrode" shielding the semiconductor substrate is located in a region of the multilayer semiconductor construction that

lies under the connecting conductor between the connecting conductor and the semiconductor substrate and shielding the semiconductor substrate from the connecting conductor where the connecting conductor crosses the semiconductor substrate.

New dependent claim 24 is dependent from claim 23 and adds that the at least one intermediate electrode comprises a plurality of intermediate electrodes completing a shielded path across the semiconductor substrate along which the connecting conductor extends.

For each of the above reasons it is urged that all of the claims now present in this application are in condition for allowance. Early, favorable further examination of the application is requested.

Enclosed is a check for \$125.00 for new claims 20 - 24. Authorization is given to charge any additional fees associated with this communication to Deposit Account No. 070135. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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